Course outcomes

Probability and Distribution Theory Students will acquire a solid understanding of probability fundamentals, including the principles of probability spaces, events, and conditional probability. They will explore various probability distributions, such as binomial, normal, and exponential, and apply these concepts to real-world scenarios. The course will also cover expectation, variance, and the properties of distributions, enabling students to model and analyze random variables effectively.

Sampling Techniques This course will teach students various sampling methods like random, stratified, and systematic sampling. They will learn how to determine appropriate sample sizes and understand sampling distributions to make accurate inferences about populations. Emphasis will be placed on minimizing sampling errors and improving the reliability of data collection and analysis.

Statistical Computing Students will develop proficiency in using statistical software tools like MINITAB for data analysis, including performing complex computations and statistical procedures. They will gain skills in data manipulation, statistical modeling, and result interpretation, preparing them to handle practical data analysis tasks efficiently.

Applied Statistics The course will focus on applying statistical methods to real-world data, including descriptive and inferential techniques. Students will learn to perform data analysis, interpret results, and communicate findings effectively through reports. This practical approach will help them address and solve real-life statistical problems.

Stochastic Processes Students will study various stochastic processes, including Markov chains and Poisson processes, to model and analyze systems with inherent randomness. They will learn how to apply these models to fields such as finance and engineering, gaining insights into the behavior of systems over time.

Linear Algebra The course will cover essential linear algebra concepts, such as matrix operations, vector spaces, and eigenvalues. Students will apply these concepts to solve linear systems and perform multivariate statistical analyses, enhancing their ability to handle complex data structures.

Real Analysis Students will explore the theoretical foundations of real analysis, including limits, continuity, and differentiability. They will study measure theory and its applications to probability and statistics, gaining a deeper understanding of the mathematical principles underlying statistical methods.

Statistical Methods This course will cover a range of statistical techniques, including hypothesis testing, confidence intervals, and regression analysis. Students will learn to apply these methods to analyze data, draw valid conclusions, and make informed decisions based on statistical evidence.

Parametric Tests Students will learn to apply parametric statistical tests such as t-tests, ANOVA, and chi-square tests. They will understand the assumptions underlying these tests, how to validate them, and how to interpret results for accurate hypothesis testing and data analysis.

Probability and Distribution Theory – II The course will delve into advanced probability distributions and their properties. Students will extend their knowledge of probability theory, applying advanced concepts to complex statistical problems and data analysis.

Linear Models and Regression Analysis Students will develop and interpret linear regression models to examine relationships between variables. They will learn to apply techniques like multiple regression and logistic regression, assess model fit, and use regression analysis for prediction and decision-making.

Statistical Computing using R The course will provide hands-on experience with R for statistical analysis, including data manipulation, visualization, and advanced statistical techniques. Students will become proficient in using R for various data analysis tasks and interpreting complex statistical results.

Advanced Sampling Techniques Students will study complex sampling designs, such as stratified and cluster sampling, and learn to apply these techniques to improve data accuracy and efficiency. The course will cover methods for handling multi-stage sampling and analyzing data from complex surveys.

Operations Research – I The course will introduce optimization techniques, including linear programming and the simplex method, to solve operational problems. Students will learn to model and optimize decision-making processes in various contexts, such as resource allocation and logistics.

Actuarial Sciences Students will explore methods for assessing and managing financial risk, with a focus on actuarial models used in insurance and pension planning. The course will cover topics such as life contingencies, risk management, and financial mathematics.

Inventory and Queuing Theory The course will cover inventory management models, including economic order quantity (EOQ) and reorder point systems. Students will also study queuing theory to analyze and optimize service processes and waiting lines in operational settings.

Statistical Inference – I Students will learn fundamental methods of statistical inference, including point and interval estimation, and hypothesis testing. The course will focus on asymptotic properties of estimators and tests, providing a foundation for making statistical inferences from data.

Multivariate Analysis This course will cover techniques for analyzing multivariate data, including principal component analysis (PCA), factor analysis, and discriminant analysis. Students will learn to reduce dimensionality, classify data, and identify patterns in complex datasets.

Survey Project Students will design and implement surveys to collect and analyze data. The course will cover all aspects of survey management, including question design, sampling, data collection, and analysis, culminating in a comprehensive survey project.

Order Statistics The course will focus on the properties and applications of order statistics, including extreme values and their distributions. Students will learn to use order statistics for statistical inference and data analysis.

Demography Students will study population dynamics, including size, structure, and trends. The course will cover demographic methods for analyzing population data and projecting future changes, with implications for social and economic planning.

Operations Research – II The course will delve into advanced operations research techniques, such as nonlinear programming, dynamic programming, and game theory. Students will apply these methods to complex operational and strategic problems, enhancing their problem-solving skills.

Bio-Statistics Students will apply statistical methods to biological and medical research, including experimental design and data analysis. The course will cover topics such as clinical trials, survival analysis, and bioinformatics.

Data Analysis using SPSS This course will provide training in using SPSS for data analysis, including statistical procedures, data manipulation, and interpretation of results. Students will become proficient in leveraging SPSS for comprehensive data analysis tasks.

Statistical Inference – II The course will cover advanced topics in statistical inference, including non-parametric methods and Bayesian inference. Students will explore techniques for handling complex data and making robust statistical inferences.

Industrial Statistics and Reliability Theory Students will apply statistical methods to industrial processes and quality control. The course will cover reliability analysis, including failure rates and life testing, to improve product quality and process reliability.

Design and Analysis of Experiments This course will teach students how to design effective experiments and analyze the resulting data. Topics include factorial designs, randomization, and analysis of variance (ANOVA), with a focus on drawing valid conclusions from experimental studies.

Non-Parametric Methods Students will learn non-parametric statistical methods, such as rank tests and permutation tests, that do not rely on parametric assumptions. The course will focus on methods for analyzing data when traditional parametric assumptions are not appropriate.

Information Theory The course will introduce concepts from information theory, including entropy, mutual information, and coding. Students will apply these principles to problems in data compression, communication, and information processing.

Bayesian Inference Students will study Bayesian methods for statistical inference, including the use of prior distributions and Bayesian updating. The course will cover techniques for computing posterior distributions and applying Bayesian approaches to various data analysis problems.

Econometrics The course will explore econometric techniques for analyzing economic data, including time series analysis and regression models. Students will learn to model and interpret economic relationships, applying econometric methods to real-world economic issues.